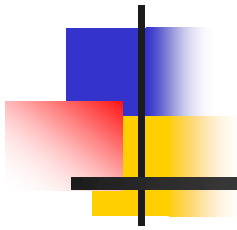
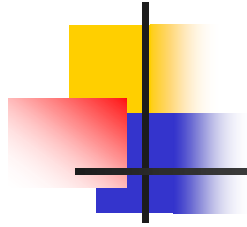


# Anthropogenic Mercury: Major Sources and Reduction Strategies



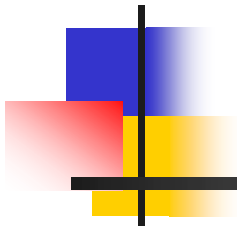


# Presentation Outline

---

- Overview of Anthropogenic Sources and Reduction Strategies
- National Context
- Initial Picture in Washington State

# Overview of Anthropogenic Mercury Sources and Reduction Strategies



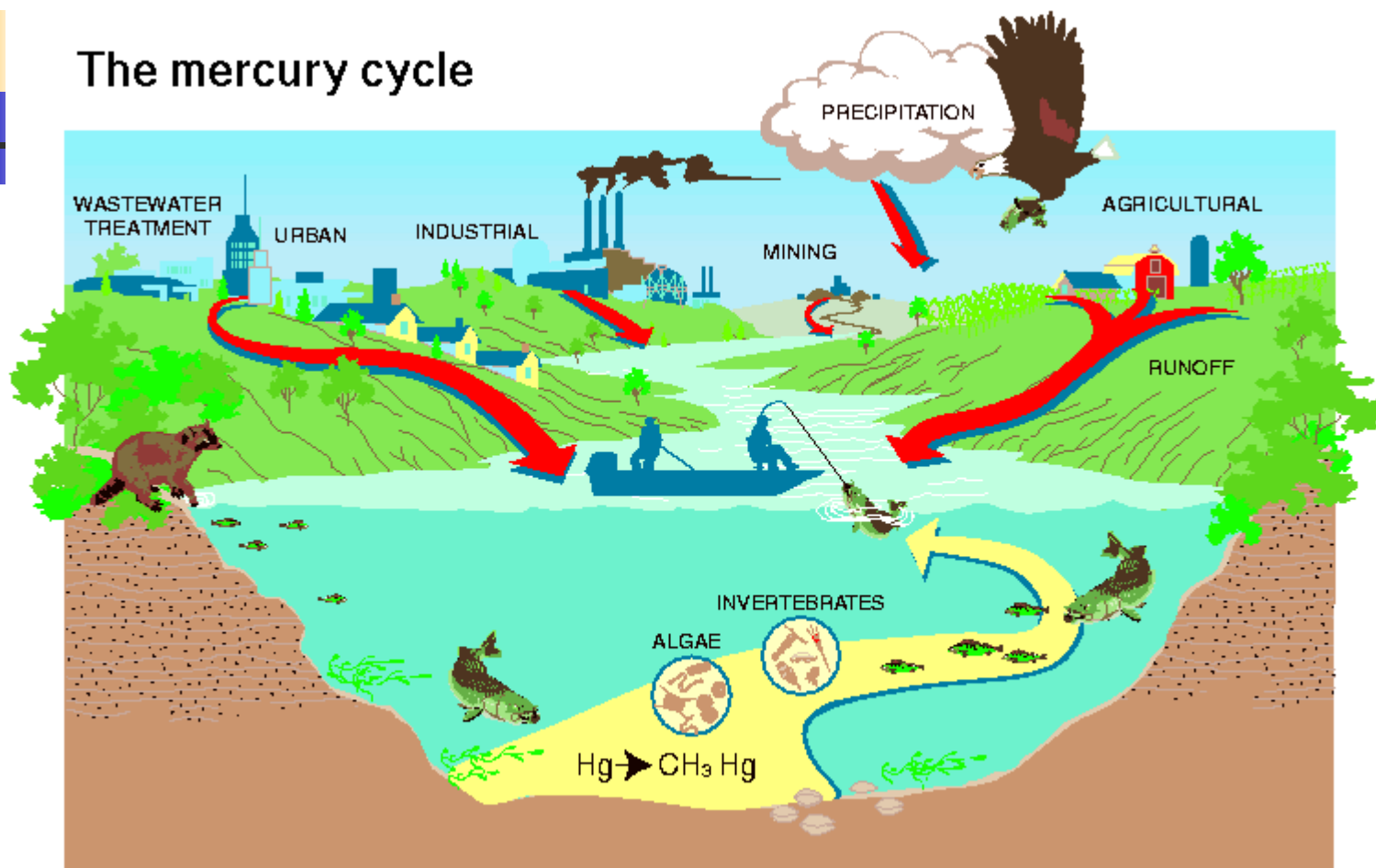


# Overview

---

- Hg in circulation roughly doubled since Industrial Revolution
- Travels long distances
- Concentrations in fish can be 1 million times water concentration
- Over 40 states have fish advisories due to mercury
- FDA fish advisories

## The mercury cycle



(Illustration by Connie J. Dean, U.S. Geological Survey)



# Anthropogenic Sources

---

- *Unintentional use*- Hg is contaminant in process or product
- *Intentional Use*- Hg is used in a product or process for a specific purpose



# Anthropogenic Sources: Unintentional Use

---

- Fossil fuels
  - coal
  - oil
  - wood
- Mining, smelting
- Caustic soda



# Sources: Unintentional Use Possible Release Points

---

- Burning of fossil fuel
- Mining waste
- Manufacture and use of products with caustic soda





# Sources: Unintentional Use Reduction Strategies

---

- Product Substitution
- End-of-Pipe Controls
- Education and Outreach



# Anthropogenic Sources: Intentional Use

---

- Some button cell batteries
- Dental amalgam
- Fluorescent lamps
- Measuring devices
- Switches, gauges
- Placer gold mining
- Chlor-alkali facilities



# Sources: Intentional Use, Possible Release Points

---

- Hg Mining
- Manufacture
- Distribution
- Use
- Disposal (burn, bury, autoclave, recycle)



# Sources: Intentional Use Reduction Strategies

---

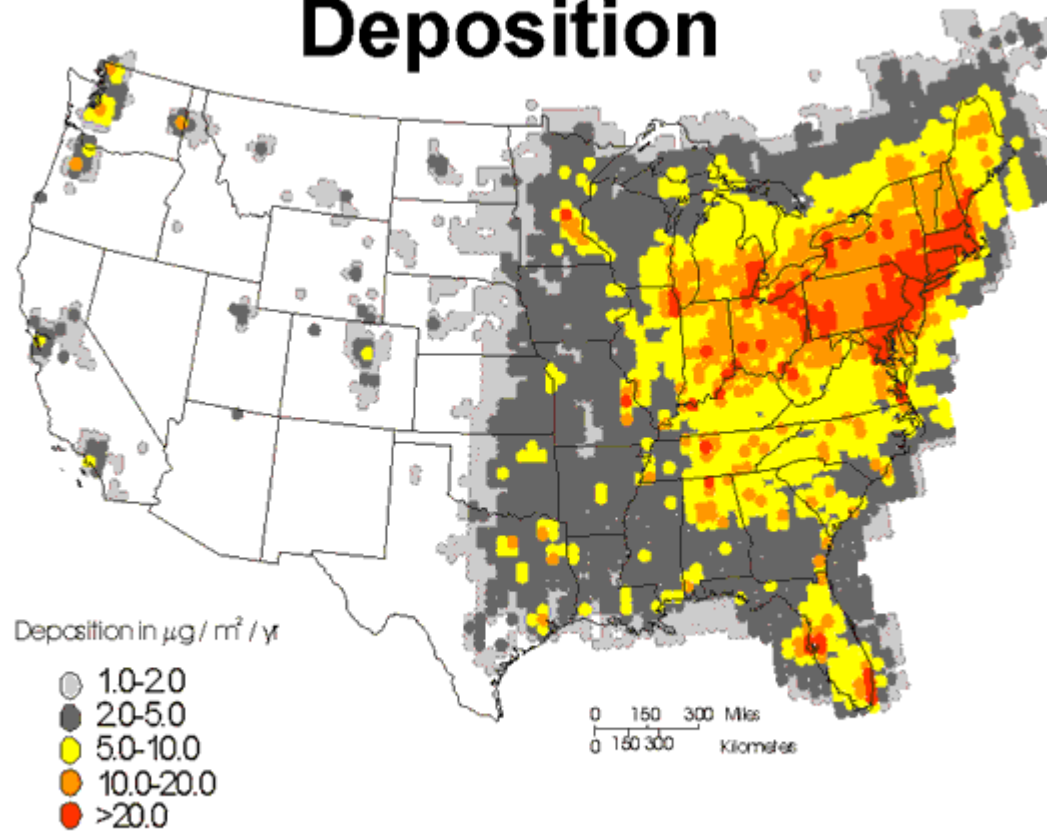
- Product Substitution
- Improved Knowledge of Spill Cleanup Procedures
- Improved Collection of Spent Products- Recycling or Long-Term Storage
- End-of-Pipe Controls on Disposal Facilities
- Outreach and Education



# National Context

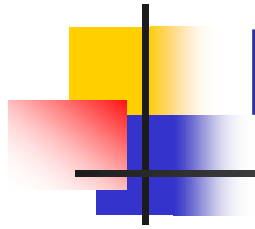
---

# National Atmospheric Hg Deposition



 **USGS**

Source: US EPA, 1998, Mercury Report to Congress



# National Context

---

- Bi-National Toxics Strategy
- New England Governors and Eastern Canadian Premiers Mercury Action Plan
- EPA Mercury Study Report to Congress
- Individual states: CA, CT, FL, IL, ME, MD, MA, MI, MN, NJ, NH, NY, OH, OR, RI, WI, VT



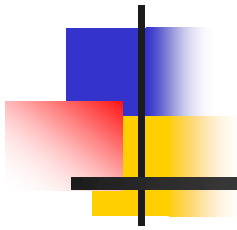
# National Context: Progress

---

- Early 1990's- Hg phased out of alkaline batteries, paints
- NE 50% Reduction by 2003 will be met
- Problem of national Hg retirement strategy



# Initial Picture in Washington State





# WA: Current Sources

---

- Dental amalgam
  - Dental offices
  - POTW's
  - Sewage Sludge- beneficial reuse & incineration
  - Crematoria
- Coal Utility Boilers
- Gold Mining



# WA- Current Sources, con't

---

- Mercury Products
  - User groups- households, medical facilities, schools, labs
  - Disposal facilities- autoclaves, landfills, incinerators



# WA: Historic Sources

---

- Gold Mining
- Chlor-alkali Facilities